Questions 26, 89, 90, 113

26) a. True
b. False, temperature measures the avg. kinetic energy, so constant temperature means the avg. kinetic energy stays the same.
c. True
d. False, as temperature increase, interparticle interaction decreases.
e. True
f. False, pressure is directly proportional to the temperature (in Kelvins) - faster particles collide with more force.

89) a. $P\ (1.000L) = 0.5000\ (0.08206)\ 298$
$P = 12.23$ atm

b. $[P_{obs} + a\ (n/V)^2] \times (V - nb) = nRT$
$[\ P_{obs} + 1.39\ (0.5/1)^2\ ] \times (1 - 0.5(0.0391)) = 0.5\ (0.08206)\ 298$
$[P_{obs} + 0.3475] \times 0.98045 = 12.23$
$P_{obs} = 12.13$ atm

c. The observed pressure of N_2 is a little (0.8%) less than an ideal gas because of the attractive forces between molecules.

90) a. $P\ (10.000L) = 0.5000\ (0.08206)\ 298$
$P = 1.223$ atm

b. $[\ P_{obs} + 1.39\ (0.5/10)^2\ ] \times (10 - 0.5(0.0391)) = 0.5\ (0.08206)\ 298$
$[P_{obs} + 0.003475] \times 9.9805 = 12.23$
$P_{obs} = 1.222$ atm

c. The observed pressure of N_2 is slightly (.08%) less than an ideal gas.
d. Because the gas in #90 is much more spread out (10x volume), intermolecular forces forces between particles are weaker. Gases act more like ideal gases when spread out (and higher temperature.)

113) The constant, b, is the correction for volume, so the larger the particle, the greater the value of b. Therefor C_3H_8 will have the greatest value.

The constant, a, is the correction for intermolecular attraction. The greater the intermolecular attraction, the greater the value of a. Of the given gases, CH_4 has the greatest value for a, it must have the greatest intermolecular attraction.